CLAIMS

What is claimed is:

1. (Currently Amended) A method of making a semiconductor device, comprising:

providing a semiconductor substrate;

forming a gate over the substrate, wherein the gate comprises a polysilicon line of a linewidth less than or equal to 50 nanometers, wherein the polysilicon line has a dielectric liner layer there over;

forming a first source/drain region adjacent to the gate on a first side of the gate and a second source/drain region adjacent the gate on a second side of the gate, wherein the dielectric liner layer extends over the first source/drain region and the second source/drain region;

implanting xenon through the dielectric liner layer into the polysilicon line at an energy and a dosage to amorphize an upper portion of the polysilicon line, wherein:

if the linewidth is between 20 and 30 nanometers, then the dosage is between 1E13 and 1E14 particles per centimeter squared and the energy is between 10 KeV and 25 KeV;

if the linewidth is between 30 nanometers and 50 nanometers, then the dosage is between 1E13 and 2E14 particles per centimeter squared and the energy is between 15 KeV and 30 KeV; and

if the linewidth is less than 20 nanometers, then the dosage is less than or equal to 1E14 particles per centimeter squared and the energy is less than or equal to 25 KeV; and

forming a metal silicide with the amorphized upper portion of the polysilicon line, wherein the metal silicide includes one of cobalt and nickel.

2. (Original) The method of claim 1, further comprising forming a sidewall spacer around the gate.

3. (Original) The method of claim 1, wherein the metal silicide is cobalt silicide.

4. (Original) The method of claim 1, wherein the first source/drain region and the second source/drain region are formed in the substrate.

5. (Original) The method of claim 1, wherein the dielectric liner layer comprises oxide.

6. (Original) The method of claim 1, wherein the implanting causes amorphization of upper portions of the first source/drain region and the second source/drain region, wherein the method further comprises forming metal silicides with the amorphized upper portions of the first source/drain region and the second source/drain region.

7. (Currently amended) A method for forming a semiconductor device, comprising:
providing a polysilicon line over a semiconductor substrate, the polysilicon line characterized as having a linewidth of less than or equal to 50 nanometers;
providing a dielectric liner over the polysilicon line;
implanting xenon through the dielectric liner into the polysilicon line to amorphize an upper portion of the polysilicon line, where the implanting is at a dosage of less than or equal to 2E14 particles per centimeter squared and an energy of less than or equal to 30 KeV; and
forming a metal silicide with the amorphized upper portion of the polysilicon line.

8. (Original) The method of claim 7, wherein the metal silicide includes cobalt.

9. (Original) The method of claim 7, wherein the metal silicide includes nickel.

10. (Original) The method of claim 7, wherein the linewidth is less than or equal to about 30 nanometers, the dosage is less than or equal to 1E14 particles per centimeter squared, and the energy is less than or equal to 25 KeV.

11. (Original) The method of claim 10, wherein the linewidth is about 30 nanometers, the energy is about 15 KeV, and the dosage is about 6E13 particles per centimeter squared.

12. (Original) The method of claim 7, wherein the linewidth is about 40 nanometers, the energy is about 20 KeV, and the dosage is about 1E14 particles per centimeter squared.

13. (Original) The method of claim 7, further comprising forming a first source/drain region on a first side of the polysilicon line and a second source/drain region on a second side of the polysilicon line prior to the implanting.

14. (Original) The method of claim 13, wherein the implanting causes amorphization of upper portions of the first source/drain region and the second source/drain region.

15. (Original) The method of claim 14, wherein a metal silicide is formed with the amorphized upper portions of the first source/drain region and the second source/drain region.

16. (Canceled)

17. (Original) The method of claim 7, wherein the dosage is greater than 1E13 particles per centimeter squared.

18. (Original) The method of claim 7, wherein the energy is greater than 10 KeV.

19. (Original) The method of claim 7, wherein if the linewidth is between 20 and 30 nanometers, then the dosage is between 1E13 and 1E14 particles per centimeter squared and the energy is between 10 KeV and 25 KeV.

20. (Original) The method of claim 7, wherein if the linewidth is between 30 nanometers and 50 nanometers, then the dosage is between 1E13 and 2E14 particles per centimeter squared and the energy is between 15 KeV and 30 KeV.

21. (Original) The method of claim 7, wherein if the linewidth is less than 20 nanometers, then the dosage is less than or equal to 1E14 particles per centimeter squared and the energy is less than or equal to 25 KeV.

22. (Currently Amended) A method of forming a semiconductor device, comprising:

forming a polysilicon line having a linewidth of less than or equal to 50 nanometers over a semiconductor substrate;

forming a liner over the polysilicon line;

implanting particles having an atomic mass at least equal to that of xenon through the liner into the polysilicon line to amorphize an upper portion of the polysilicon line, wherein the implanting is at an energy of less than or equal to 30 KeV and a dosage of less than or equal to 2E14 particles per centimeter squared; and

forming a metal silicide with the amorphized upper portion of the polysilicon line.

23. (Original) The method of claim 22, wherein the metal silicide comprises cobalt silicide.

24. (Original) The method of claim 22, wherein the linewidth is less than about 30 nanometers, the dosage is less than or equal to 1E14 particles per centimeter squared, and the energy is less than or equal to 20 KeV.

25. (Original) The method of claim 22, wherein the particles includes xenon.

26. (Original) The method of claim 22, further comprising forming source/drain regions adjacent to the line prior to the implanting, wherein the implanting is further characterized as amorphizing upper portions of the source/drain regions and wherein metal silicide is formed with the amorphized upper portions of the source/drain regions.

27. (Currently Amended) The method of claim 26, ~~further comprising~~ wherein the forming [[a]] the liner over the polysilicon line ~~and~~ further includes forming the liner over the source/drain regions prior to implanting and removing portions of the liner prior to forming the metal silicide.

28. (Original) The method of claim 22, wherein if the linewidth is between 20 and 30 nanometers, then the dosage is between 1E13 and 1E14 particles per centimeter squared and the energy is between 10 KeV and 25 KeV.

29. (Original) The method of claim 22, wherein if the linewidth is between 30 nanometers and 50 nanometers, then the dosage is between 1E13 and 2E14 particles per centimeter squared and the energy is between 15 KeV and 30 KeV.

30. (Original) The method of claim 22, wherein if the linewidth is less than 20 nanometers, then the dosage is less than or equal to 1E14 particles per centimeter squared and the energy is less than or equal to 25 KeV.

31. (New) A method of forming a semiconductor device, comprising:
forming a polysilicon line over a semiconductor substrate;
forming a liner over the polysilicon line;
implanting particles having an atomic mass at least equal to that of xenon through the liner into the polysilicon line to amorphize an upper portion of the polysilicon line; and
forming a metal silicide with the amorphized upper portion of the polysilicon line.